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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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07/30/2003

Tsutomu Ohzuku

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EXAMINER

LEE, CYNTHIA K

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/629,815	Applicant(s) OHZUKU ET AL.	
	Examiner CYNTHIA LEE	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 14-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 14-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/10/2008 has been entered.

Response to Amendment

This Office Action is responsive to the amendment filed on 12/10/2008. Claims 1, 3-9, and 14-18 are pending. Claims 2, 10-13 are canceled.

Applicant's arguments have been considered. Claims 1, 3-9 and 14-18 are rejected for reasons stated herein below.

Information Disclosure Statement

The Information Disclosure Statement (IDS) filed 7/29/2008 and 10/29/2008 has been placed in the application file and the information referred to therein has been considered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3-9, and 14-18 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$, does not reasonably provide enablement for a positive electrode active material comprising a lithium containing composite oxide containing at least nickel and manganese elements, said positive electrode active material comprising primary particles of said composite oxide having a twinning portion, the composite oxide further contains cobalt element, and the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level (claim 1), wherein said composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure (claim 1), wherein said composite oxide has a defected or disordered portion in the crystal lattice thereof (claim 3), wherein said composite oxide has a superlattice arrangement of a $[\sqrt{3} \times \sqrt{3}]$ R30 when assigned as R3-m (claim 4), wherein said composite oxide has an integrated intensity ratio (003)/(004) of the X-ray diffraction peak when assigned as R3-m which satisfies the equation: $(003)/(104) \leq 1.2$ (claim 6), wherein said composite oxide has an extra spot or streak substantially in every electron beam diffraction pattern indexed when assigned as R3-m (claim 7), wherein said primary particles have at least one of spherical and rectangular parallelepiped hexahedron shapes (claim 8).

The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

The claimed invention encompasses compounds that are outside the scope of the one working example and disclosure. Not only are the claims broad, it appears that

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the amount of direction, the number of working examples, and the breadth of claims are not commensurate in scope with the disclosure as originally filed. Hence undue experimentation would be required to determine what other compounds other than those disclosed by applicant can be used to make and practice applicant's invention as claimed.

With respect to enablement commensurate in scope with the claims, section 2164.08 of the MPEP states:

"The Federal Circuit has repeatedly held that 'the specification must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation'. In re Wright, 999 F.2d 1557, 1561, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993)... The determination of the propriety of a rejection based upon the scope of a claim relative to the scope of the enablement involves two stages of inquiry. The first is to determine how broad the claim is with respect to the disclosure. The entire claim must be considered. The second inquiry is to determine if one skilled in the art is enabled to make and use the entire scope of the claimed invention without undue experimentation."

Factors to be considered when determining whether the claimed invention would require undue experimentation are given in MPEP 2164.01 (a). In re Wands, 858 F. 2d 731, 737; 8 USPQ 2d 1400, 1404 (Fed. Cir. 1988). Only the relevant factors will be addressed for determining undue experimentation of the presently claimed invention. The relevant factors are (A) the breadth of the claims; (B) the amount of direction provided by the inventor; (C) the existence of working examples, (D) the level of

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predictability in the art; and (E) the quantity of experimentation needed to make or used the invention based on the content of the disclosure.

Factor (A) Breadth of the claims:

No guidance is given in the specification for the innumerable possible embodiments encompassed by the claims of said positive electrode active material comprising primary particles of said composite oxide having a twinning portion, the composite oxide further contains cobalt element, and the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level (claim 1), wherein said composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure (claim 2), wherein said composite oxide has a defected or disordered portion in the crystal lattice thereof (claim 3), wherein said composite oxide has a superlattice arrangement of a $[\sqrt{3} \times \sqrt{3}] R30$ when assigned as R3-m (claim 4), wherein said composite oxide has an integrated intensity ratio (003)/(004) of the X-ray diffraction peak when assigned as R3-m which satisfies the equation: $(003)/(104) \leq 1.2$ (claim 6), wherein said composite oxide has an extra spot or streak substantially in every electron beam diffraction pattern indexed when assigned as R3-m (claim 7), wherein said primary particles have at least one of spherical and rectangular parallelepiped hexahedron shapes (claim 8). The positive active material as recited in the claims encompasses compounds that are not lithium nickel cobalt manganese oxide compounds disclosed in the instant specification. The specification is directed only to

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$\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$ and does not disclose how to make positive electrode active materials with the properties recited in the claims.

Factor (B) The amount of direction provided by the inventor.

Applicant gives guidance of the production of the positive electrode active material $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$. Applicant also only provides 1 working example that meet the properties of claim 1. Hence, the general teaching and the examples in the specification do not give guidance on how to make positive electrode active materials positive electrode active materials with the properties recited in the claims.

Factor (C) The existence of working examples:

As stated above, applicant's disclosure of 1 working example does not entitle applicant to claim all positive electrode active material containing Li, Co, Ni, and Mn having a twinning portion and uniformly dispersed at the atomic level.

MPEP 2164.03 states "[h]owever, in applications directed to inventions in arts where the results are unpredictable, the disclosure of a single species usually does not provide an adequate basis to support generic claims."

Factor (D) The level of predictability in the art:

The properties as claimed in claims 1-4 and 6-8 of the active material can depend on multiple factors, such as in the method by which the particles were made, as well as initial nickel, cobalt, and manganese precursors. Thus, there is a level of

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unpredictability in the art with respect to obtaining the claimed properties of the primary particles of the positive electrode active material.

With respect to the relationship of predictability of the art and the enablement requirement, MPEP 2164.03 states:

“The amount of guidance or direction needed to enable the invention is inversely related to the amount of knowledge in the state of the art as well as the predictability in the art. In re Fisher, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970). The “amount of guidance or direction” refers to that information in the application, as originally filed, that teaches exactly how to make or use the invention. The more that is known in the prior art about the nature of the invention, how to make, and how to use the invention, and the more predictable the art is, the less information needs to be explicitly stated in the specification. In contrast, if little is known in the prior art about the nature of the invention and the art is unpredictable, the specification would need more detail as to how to make and use the invention in order to be enabling. >See, e.g., Chiron Corp. v. Genentech Inc., 363 F.3d 1247, 1254, 70 USPQ2d 1321, 1326 (Fed. Cir. 2004)...The “predictability or lack thereof” in the art refers to the ability of one skilled in the art to extrapolate the disclosed or known results to the claimed invention. If one skilled in the art can readily anticipate the effect of a change within the subject matter to which the claimed invention pertains, then there is predictability in the art. On the other hand, if one skilled in the art cannot readily anticipate the effect of a change within the subject matter to which that claimed invention pertains, then there is lack of predictability in the art. Accordingly, what is known in the art provides evidence as to the question of predictability...However, in applications directed to inventions in arts where the results are unpredictable, the disclosure of a single species usually does not provide an adequate basis to support generic claims. In re Soll, 97 F.2d 623, 624, 38 USPQ 189, 191 (CCPA 1938). In cases involving unpredictable

factors, such as most chemical reactions and physiological activity, more may be required.

In re Fisher, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970)[emphasis added].”

Factor (E) the quantity of experimentation needed to make or used the invention based on the content of the disclosure.

This factor has been addressed by factors (A)-(C) above.

Thus, the claims are properly rejected for scope of enablement since the two stages of inquiry as set forth in MPEP section 2164.08 have been fully addressed herein by the Examiner.

Addressing arguments regarding the scope of enablement submitted on 12/10/2008:

Applicant argues that it is not sufficient to merely argue that a claim is broad to allege lack of enablement and that several examples of different positive electrode active materials are given in Table 5.

It is noted that not only are claims broad, but the amount of direction, the number of working examples are lacked in the Specification. The Examiner notes that the Specification does not disclose that the materials given in Table 5 are “uniformly dispersed at the atomic level, wherein said composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure” as recited in claim 1.

Although the Applicant argues that not all In re Wands factors were addressed, it is noted that only the relevant factors need to be addressed. Refer to MPEP 2164.04.

Applicant asserts that the claims are not unduly broad. The Examiner remains unpersuaded. It is noted that there is a myriad of possible combinations with an active material having nickel, manganese, and cobalt. Considering the myriad of combinations, Applicant has not disclosed any guidance to lead one of ordinary artisan to choose "a layered structure with a cubic close-packed structure".

Applicant argues that one of ordinary skill in the art would be able to make a coprecipitated hydroxide of various compositions including Ni, Mn, and Co and to form twining portion by means of a baking process because the twining portion is achieved when the nickel, manganese, and cobalt elements are uniformly achieved when the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level and that rapid heating and quenching are effective methods for forming the twining portion.

Applicant is advised to make the record clear whether if the above argument implies that any combination of Ni, Mn, and Co formed by coprecipitation method results in the atomic structure as claimed in the instant claims.

Regarding the level of predictability, the Examiner's position remains.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-8 and 14-18 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ohzuku (Layered Lithium Insertion Material of $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$ for Lithium-Ion Batteries, Chemistry Letters 2001, the Chemical Society of Japan, pgs 642-643).

Ohzuku discloses a positive electrode material comprising the formula $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$ (see Abstract).

Ohzuku does not expressly disclose the crystal structure of the above formula as claimed by the Applicants in claims 1-4 and 6-8. However, the Examiner notes that while the prior art does not explicitly teach these properties, these are considered inherent in the prior art barring any differences shown by objective evidence between the positive electrode material disclosed in the prior art and the applicant. As the positive active material taught by the prior art and the applicant are identical within the scope of claims, 1, 3, 4, 6-8, Ohzuku inherently teaches the crystalline properties as claimed by the Applicants.

A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999). The courts have held that claiming of a property or characteristic which is inherently present in the prior art does not necessarily make the claim patentable. In re Best, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977). See MPEP 2112 and 2112.01.

When the Examiner has provided a sound bases for believing that the products of the applicant and the prior art are the same, the burden of proof is shifted to the applicant to prove that the product shown in the prior art does not possess the characteristics of the claimed product. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Regarding claim 14, Ohzuku discloses a $\text{Li/LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$ cell (see fig. 3). A cell necessarily contains an electrolyte.

The Examiner notes that Ohzuku meets the limitation "uniform dispersion" for the following reason. As Applicant indicated, red indicates high concentration, green represents a low concentration, and yellow represents an intermediate concentration. The Examiner disagrees with the Applicant that the instant invention has uniform dispersion because should this be correct, the micrographs of the instant invention should be all red, all yellow, or all green. The fact that the micrographs of the instant invention possess all three colors indicate that the dispersion is not uniform. The Examiner interprets that the micrograph of the prior art demonstrates "uniform dispersion" because it is mostly green.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 4, 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohzuku (Layered Lithium Insertion Material of $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$ for Lithium-Ion Batteries, Chemistry Letters 2001, the Chemical Society of Japan, pgs 642-643) in view of Ohzuku (JP 2002-042813, relying upon the English equivalent US 6551744 for translation).

Should the above 102/103 rejection not be anticipatory, Ohzuku '813 teaches of making a metal oxide as positive electrode materials by coprecipitation method (6:53-65). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the metal oxide of Ohzuku '390 by the coprecipitation method since it has been known to use the coprecipitation method to yield predictable results of making transition metal oxide for positive electrode materials.

It is noted that Applicants also use the coprecipitation method to produce positive electrode material. See instant Specification pgs 23 and 24. The Examiner notes that while the prior art does not explicitly teach the properties as claimed in claims 1, 3, 4, 6-8, these are considered inherent in the prior art barring any differences shown by

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objective evidence between the positive electrode material disclosed in the prior art and the applicant. As the positive active material taught by the prior art and the applicant are identical within the scope of claims 1, 3, 4, and 6-8, Ohzuku inherently teaches the crystalline properties as claimed by the Applicants.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohzuku (Layered Lithium Insertion Material of $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$ for Lithium-Ion Batteries, Chemistry Letters 2001, the Chemical Society of Japan, pgs 642-643) as applied to claim 1 above, and further in view of Miyasaka (US 6416902).

Ohzuku discloses all the elements of claim 1 and are incorporated herein.

Ohzuku discloses particles but does not disclose primary particles and secondary particles as claimed in Applicant's claim 9. However, Miyasaka discloses a lithium ion battery comprising a positive electrode with a mean grain size in the range of 1 to 30 μm for secondary particles and in the range of 0.1 to 0.5 for primary particles (5:48-57). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have primary and secondary particles as taught by Miyasaka for the benefit of having two particle size distribution. Having two particle size distribution will enhance better packing of because smaller particles will be able to occupy void spaces between larger particles.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohzuku (Layered Lithium Insertion Material of $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$ for Lithium-Ion Batteries,

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Chemistry Letters 2001, the Chemical Society of Japan, pgs 642-643) in view of Ohzuku (JP 2002-042813, relying upon the English equivalent US 6551744 for translation) as applied to claim 1 above, and further in view of Miyasaka (US 6416902).

Ohzuku '315 modified by Ohzuku '813 teaches particles but does not disclose primary particles and secondary particles as claimed in Applicant's claim 9.

However, Miyasaka discloses a lithium ion battery comprising a positive electrode with a mean grain size in the range of 1 to 30 um for secondary particles and in the range of 0.1 to 0.5 for primary particles (5:48-57). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have primary and secondary particles as taught by Miyasaka for the benefit of having two particle size distribution. Having two particle size distribution will enhance better packing of because smaller particles will be able to occupy void spaces between larger particles.

Response to Arguments

Applicant's arguments regarding 102/103 rejection of Ohzuku ('813) have been found persuasive and has been withdrawn.

Applicant's arguments filed 12/10/2008 regarding Ohzuku ('390) have been fully considered but they are not persuasive.

Applicant argues that in the instant Application, the elements are evenly dispersed and in Ohzaki CL-010390, segregation of Co is observed. It is noted that the Examiner has taken a different interpretation of "uniform" dispersion, and notes that

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micrograph of the prior art demonstrates "uniform dispersion" because it is mostly green.

Declaration submitted on 2/20/2007

As Applicant indicated, red indicates high concentration, green represents a low concentration, and yellow represents an intermediate concentration. First, the Examiner disagrees with the Applicant that the instant invention has uniform dispersion because should this be correct, the micrographs should be all red, all yellow, or all green. The fact that the micrographs of the instant invention possess all three colors indicate that the dispersion is not uniform. The Examiner interprets the micrograph of the prior art to have "uniform dispersion" because it is mostly green.

Applicant argues that the Examiner's interpretation of "uniform dispersal" is unreasonable because there is a significant difference between the uniform dispersal of the claimed composition and the prior art because the instant invention is more uniformly dispersed than the prior art that has well-defined, widely-separated areas of high and low concentration. The Examiner notes that the claim limitation "uniform dispersal" is not met in comparison of the instant invention, but by the interpretation of the claim limitation. It is reiterated that the Examiner interprets the micrograph of the prior art to have "uniform dispersion" because it is mostly green.

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art
Unit 1795